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EXAMINER
VU, QUANG D

ART UNIT	PAPER NUMBER
2811	3

DATE MAILED: 12/27/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/039,615	Applicant(s) WALLACE, ROBERT F.	
	Examiner Quang D Vu	Art Unit 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-19 is/are pending in the application.

4a) Of the above claim(s) 20-25 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-19 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-19, drawn to a molded semiconductor device package, classified in class 257, subclass 787.

II. Claims 20-25, drawn to a method for forming electrical connections on a semiconductor device, classified in class 438, subclass 124.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the device of group I invention could be made by as a materially different process. For example, connecting the ball bonding of the bonding wire to the conductive bump on the bond pad of the die and then connecting to the opposite end of the bonding wire to the contact lead, instead of connecting the ball bonding of the bonding wire to the contact lead and then connecting the opposite end of the bonding wire to the conductive bump on the bond pad of the die.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

During a telephone conversation with Phillip Lee on 08/23/2002 a provisional election was made without traverse to prosecute the invention of group I, claims 1-19. Affirmation of this election must be made by applicant in replying to this Office action. Claims 20-25 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 6,399,421 to Han et al.

Regarding claim 1, Han et al. (figure 3) teach a molded semiconductor device package comprising:

a die attach pad (59);

a first (42) and second (50) semiconductor die, each die having a die bond pad (48, 58), each of the die positioned such that the die bond pads (48, 58) of each die face in opposite directions, the first (42) and second (50) die being connected to opposing surfaces of the die attach pad (59);

a contact lead (62) positioned proximate to the first (42) and second (50) die;

a first bonding wire (40) that is stitch bonded to the die bond pad (48) of the first die (42);

a second bonding wire (40) that is stitch bonded to the die bond pad (58) of the second die (50); and

a molding cap (66) that encapsulates the first (42) and second (50) die, the first and second bonding wire (40), and a portion of the contact lead (62).

Han et al. differ from the claimed invention by not showing the molding cap has a thickness of less than about 1 millimeter. It would have been obvious to one having ordinary skill in the art at the time the invention was made for the molding cap has a thickness of less than about 1 millimeter, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 4, Han et al. teach the first bonding wire (40) is also stitch bonded to the contact lead (62) and the second bonding wire (40) is also stitch bonded to the contact lead (62).

Regarding claim 5, Han et al. teach the first and second bonding wire (40) are formed of a material selected form gold (column 4, lines 41-42).

3. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 6,399,421 to Han et al. as applied to claim 1 above, and further in view of US Patent No. 5,463,253 to Waki et al.

Regarding claim 2, Han et al. differ from the claimed invention by not showing a first conductive ball formation that is formed between the first bonding wire and the die bond pad of the first die; and a second conductive ball formation that is formed between the second bonding wire and the die bond pad of the second die. However, Waki et al. (figure 3D) teach a first

conductive ball formation (27) that is formed between the first bonding wire and the die (22); and a second conductive ball formation (27) that is formed between the second bonding wire and the die (24). It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the conductive ball formation of Waki et al. into the device taught by Han et al. because it is desirable securely to hold the wire in place. The combined device shows a first conductive ball formation that is formed between the first bonding wire and the die bond pad of the first die; and a second conductive ball formation that is formed between the second bonding wire and the die bond pad of the second die.

4. Claims 3, 7 and 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 6,399,421 to Han et al. as applied to claim 1 above, and further in view of US Application Publication 2002/0137327 to Arakawa.

Regarding claim 3, Han et al. differ from the claimed invention by not showing the first bonding wire is also ball bonded to the contact lead and the second bonding wire is also ball bonded tot eh contact lead. However, Arakawa (figure 1) teaches the bonding wire (1) is also ball bonded to the contact lead (10). It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the ball bonded to the contact lead of Arakawa into the device taught by Han et al. because it is desirable securely to hold the wire in place. The combined device shows the first bonding wire is also ball bonded to the contact lead and the second bonding wire is also ball bonded to the contact lead.

Regarding claim 7, Han et al. (figure 3) teach a molded semiconductor device package comprising:

a die attach pad (59);

a first (42) and a second (50) semiconductor die, each die having a die bond pad (48, 58), each of the die (42, 50) positioned such that the die bonds (48, 58) of each die face in opposite directions, the first (42) and second (50) die being connected to opposing surface of the die attach pad (59);

a contact lead (62) positioned proximate to the first (42) and second (50) die;

a first bonding wire (40) that is stitch bonded to the die bond pad (48) of the first die (42);

a second bonding wire (40) that is stitch bonded to the die bond pad (58) of the second die (50); and

a molding cap (66) that encapsulates the first (42) and second (50) die, the first and second bonding wire (40), and a portion of the contact lead (62).

Han et al. differ from the claimed invention by not showing a first bonding wire that is ball bonded to the contact lead; and a second bonding wire that is ball bonded to the contact lead. However, Arakawa (figure 1) teaches the bonding wire (1) is also ball bonded to the contact lead (10). It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the ball bonded to the contact lead of Arakawa into the device taught by Han et al. because it is desirable securely to hold the wire in place. The combined device shows the first bonding wire is also ball bonded to the contact lead and the second bonding wire is also ball bonded to the contact lead.

Regarding claim 9, Han et al. teach the first and second bonding wire (40) are formed of a material selected form gold (column 4, lines 41-42).

Regarding claim 10, Han et al. differ from the claimed invention by not showing the molding cap has a thickness of less than about 1 millimeter. It would have been obvious to one having ordinary skill in the art at the time the invention was made for the molding cap has a thickness of less than about 1 millimeter, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 11, Han et al. teach the first die contains integrated circuit components configured to form a memory or a logic unit (column 1, lines 26-29).

5. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 6,399,421 to Han et al. as applied to claim 1 above, and further in view of US Patent No. 6,437,429 to Su et al.

Regarding claim 6, Han et al. differ from the claimed invention by not showing the package is either a thin small outline package or a quad flat pack package. However, Su et al. teach the package is a thin small outline package or a quad flat pack package (column 1, lines 13-20). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teaching of Su et al. into the device taught by Han et al., since it is a conventional semiconductor device package.

6. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Han et al. and Arakawa as applied to claim 7 above, and further in view of US Patent No. 6,437,429 to Su et al.

Regarding claim 8, Han et al. and Arakawa differ from the claimed invention by not showing the package is either a thin small outline package or a qua flat pack package. However, Su et al. teach the package is a thin small outline package or a quad flat pack package (column 1, lines 13-20). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teaching of Su et al. into the device taught by Han et al., since it is a conventional semiconductor device package.

7. Claims 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6,399,421 to Han et al. and US Application Publication No. 2002/0137327 to Arakawa in view of US Patent No. 5,463,253 to Waki et al.

Regarding claim 12, Han et al. (figure 3) teach a molded semiconductor device package comprising:

a pair of semiconductor dice (42, 50) that are oriented such that a top surface of each die are facing in opposite directions, the top surface of each die having at least one die bond pad (48, 58);

at least one contact lead (62) positioned proximate to the pair of semiconductor dice (42, 50);

a molding cap (66) that encapsulated the pair of semiconductor dice (42, 50), the bonding wire (40) and a portion of the contact lead (62).

Han et al. differ from the claimed invention by not showing at least one bonding wire that is ball bonded to the contact lead and stitch bonded to the conductive ball formation. However, Arakawa (figure 1) teaches the bonding wire (1) is also ball bonded to the contact lead (10) and

stitch bonded to the conductive ball formation. It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the ball bonded to the contact lead of Arakawa into the device taught by Han et al. because it is desirable securely to hold the wire in place. The combined device shows at least one bonding wire that is ball bonded to the contact lead and stitch bonded to the conductive ball formation.

Han et al. and Arakawa differ from the claimed invention by not showing a conductive ball formation positioned on the die bond pad. However, Waki et al. (figure 3D) teach a conductive ball formation (27) that is formed on the die (22). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the conductive ball formation of Waki et al. into the device taught by Han et al. and Arakawa because it is desirable securely to hold the wire in place. The combined device shows a conductive ball formation positioned on the die bond pad.

Regarding claim 13, Han et al. teach a die attach pad (59) that is attached to and sandwiched between the pair of semiconductor dice (42, 50).

Regarding claim 14, Han et al. teach the bonding wire (40) is gold. (column 4, lines 41-42).

Regarding claim 15, Han et al. differ from the claimed invention by not showing the molding cap has a thickness of less than about 1 millimeter. It would have been obvious to one having ordinary skill in the art at the time the invention was made for the molding cap has a thickness of less than about 1 millimeter, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

8. Claims 16, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6,399,421 to Han et al.

Regarding claim 16, Han et al. (figure 3) teach a molded semiconductor device package comprising:

a die attach pad (59);

a first (42) and a second (50) semiconductor die, each die having a die bond pad (48, 58), each of the die positioned such that the die bond pads of each die face in opposite directions, the first (42) and second (50) die being connected to opposing surfaces of the die attach pad (59);

a contact lead (62) positioned proximate to the first (42) and second (50) die;

a first gold bonding wire (40) that is stitch bonded to the contact lead (62) and stitch bonded to the die bond pad (48) of the first die (42), wherein the first gold bonding wire (40) was stitch bonded to the contact lead (62) before being stitch bonded to the die bond pad (48);

a second gold bonding wire (40) that is stitch bonded to the contact lead (62) and stitch bonded to the die bond pad (58) of the second (50) die, wherein the second gold bonding wire (40) was stitch bonded to the contact lead (62) before being stitch bonded to the die bond pad (58); and

a molding cap (66) that encapsulated the first (42) and second (50) die, the first and second bonding wire (40), and a portion of the contact lead (62).

Han et al. differ from the claimed invention by not showing a first aluminum bonding wire that is stitch bonded to the contact lead and stitch bonded to the die bond pad of the first die, wherein the first aluminum bonding wire was stitch bonded to the contact lead before being

stitch bonded to the die bond pad; and a second aluminum bonding wire that is stitch bonded to the contact lead and stitch bonded to the die bond pad of the second die, wherein the second aluminum bonding wire was stitch bonded to the contact lead before being stitch bonded to the die bond pad. It would have been obvious to one having ordinary skill in the art at the time the invention was made for a first aluminum bonding wire that is stitch bonded to the contact lead and stitch bonded to the die bond pad of the first die, wherein the first aluminum bonding wire was stitch bonded to the contact lead before being stitch bonded to the die bond pad; and a second aluminum bonding wire that is stitch bonded to the contact lead and stitch bonded to the die bond pad of the second die, wherein the second aluminum bonding wire was stitch bonded to the contact lead before being stitch bonded to the die bond pad, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use. In re Leshin, 125 USPQ 416.

Regarding claim 18, Han et al. differ from the claimed invention by not showing the molding cap has a thickness of less than about 1 millimeter. It would have been obvious to one having ordinary skill in the art at the time the invention was made for the molding cap has a thickness of less than about 1 millimeter, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 19, Han et al. teach the first die contains integrated circuit components configured to form a memory or a logic unit (column 1, lines 26-29).

9. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 6,399,421 to Han et al. as applied to claim 16 above, and further in view of US Patent No. 6,437,429 to Su et al.

Regarding claim 17, Han et al. differ from the claimed invention by not showing the package is either a thin small outline package or a quad flat pack package. However, Su et al. teach the package is a thin small outline package or a quad flat pack package (column 1, lines 13-20). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teaching of Su et al. into the device taught by Han et al., since it is a conventional semiconductor device package.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quang D Vu whose telephone number is 703-305-3826. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 703-308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

qv
December 23, 2002

Sara W Crane

Sara Crane
Primary Examiner